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Identifying contextual influences of community reintegration among injured servicemembers

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Abstract—Research suggests that community reintegration (CR) after injury and rehabilitation is difficult for many servicemembers. However, little is known about the influence of the contextual factors, both personal and environmental, on CR. Framed within the International Classification of Functioning, Disability and Health and social cognitive theory, the quantitative portion of a larger mixed-methods study of 51 injured, community-dwelling servicemembers compared the relative contribution of contextual factors between groups of servicemembers with different levels of CR. Cluster analysis indicated three groups of servicemembers showing low, moderate, and high levels of CR. Statistical analyses identified contextual factors that significantly discriminated between CR clusters. Multivariate analysis of variance and discriminant analysis indicated significant contributions of general self-efficacy, services and assistance barriers, physical and structural barriers, attitudes and support barriers, perceived level of disability and/or handicap, work and school barriers, and policy barriers to CR scores. Overall, analyses indicated that injured servicemembers with lower CR scores had lower general self-efficacy scores, reported more difficulty with environmental barriers, and reported their injuries as more disabling.

Key words: assistance barriers, community dwelling, community reintegration, contextual factors, CR, environmental factors, general self-efficacy, injured military servicemembers, personal factors, rehabilitation.

INTRODUCTION

Community reintegration (CR) is difficult for many military servicemembers with physical and psychological injuries sustained in theater as well as during times of nondeployment. Among servicemembers who have received medical care in the Department of Veterans Affairs system, approximately 40 percent reported some to extreme difficulty with their transition to civilian life [1]. More specifically, 49 percent expressed difficulty with community involvement, 35 to 49 percent reported limited productivity,

Abbreviations: BI = brain injury; CHIEF = Craig Hospital Inventory of Environmental Factors; CHIEF-SF = CHIEF short form; CR = community reintegration; CRIS = Community Reintegration of Injured Service Members; EOP = Extent of Participation Scale; GAD = generalized anxiety disorder; ICF = International Classification of Functioning, Disability and Health; LSD = least significant difference; MANOVA = multivariate analysis of variance; NGSE = New General Self-Efficacy Scale; PTSD = posttraumatic stress disorder; SCI = spinal cord injury; SCT = social cognitive theory; SWP = Satisfaction with Participation Scale.

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28 to 45 percent reported problems with social relations including divorce or separation, 31 percent reported problems with substance abuse, and 57 percent reported difficulty with anger control. Servicemembers with posttraumatic stress disorder (PTSD) were significantly more likely to report difficulty in many of these categories. Of the sample, 96 percent reported an interest in receiving treatment services to help with reintegrating [1]. Although the findings from Sayer et al. shed light on difficulties with CR among servicemembers [1], it is important to understand how servicemembers with more severe injuries differ in their ability to engage in home and community activities.

Resnik et al. noted that injured servicemembers with PTSD, substance abuse, depression, or other mental health disorders demonstrated lower levels of CR than their counterparts without mental health disorders [2]. More specifically, researchers have indicated that satisfaction with participation was lower for servicemembers with depression than servicemembers who did not have depression [3]. In another study, Resnik et al. found that servicemembers with brain injury (BI) and PTSD had significantly lower satisfaction with participation, lower extent of participation, and higher perceived limitations than those without BI and PTSD [4]. Servicemembers with depression reported lower extent of participation and satisfaction with participation but were not significantly lower on perceived limitations. Although researchers have identified difficulties with CR among injured servicemembers, no studies have identified the influence of contextual factors and their effect on the ability of injured servicemembers to reintegrate into their homes and communities [5].

Similar to previous studies, this project framed CR and contextual factors using the International Classification of Functioning, Disability and Health (ICF) [6]. The activities and participation domains of the ICF focus on the person's ability to be involved in certain tasks and in society, which strongly relates to CR [7–8]. Activities and participation domains refer to learning and applying knowledge; general tasks and demands; communication; mobility; self-care; domestic life; interpersonal interactions and relationships; major life areas; and community, social, and civic life. In particular, the ICF indicates that a person can experience limitations and restrictions in many of these domains and concepts of the ICF that are inherent in CR [3–4].

In addition to the ICF's conceptualization, previous literature on CR has focused on both objective and subjective measures of the construct [7]. Objectively, CR can be described as how often and how independently the person can *participate* in daily activities such as home, social, and productive activity (e.g., work, school, volunteering). Subjectively, CR can be described as the person's *perception* of his or her ability to integrate into the community and engage in these activities. It has been recommended that CR be assessed both objectively and subjectively to gain a more accurate understanding of reintegration [7]; therefore, this study measured CR through both objective and subjective means.

Contextual Factors and Community Reintegration

According to the ICF, contextual factors refer to the "physical, social and attitudinal environment in which people live and conduct their lives" (p. 12) [9] and include environmental and personal factors. Environmental factors are fully classified in the ICF, while personal factors are not. In this article, social cognitive theory (SCT) was used to help identify personal factors affecting servicemember CR because it posits that personal agency plays a major role in behavior change [10].

For the measurement of environmental factors, this study used the ICF's classification to identify the environmental influences affecting the servicemember's ability to function and participate in various home and community activities. Each domain is broken down into a series of components that further conceptualize the domain. Each environmental component can be classified as either a *facilitator* or *barrier* of functioning and participation in activity. A facilitator is a component that assists in participation, whereas a barrier is a component that hinders participation.

Previous studies suggest that social support, a component of environmental factors, is a primary facilitator of participation and contributor to quality of life for servicemembers. Social support plays a key role in buffering the psychological effects of combat and enhances quality of life. Yazicioğlu et al. reported that social support has a greater influence on quality of life compared with other variables such as sociodemographics and medical support among injured servicemembers [9]. Social support through family, friends, and fellow servicemembers has been shown to act as a buffer against suicide in the military [11], influence preference of family-based mental health services postdeployment through the use of family-based

interventions [12], and motivate injured servicemembers to seek personal improvement through participation in recreation and sport [13–14].

A person's environment can also serve as a barrier. For instance, Whiteneck et al. identified barriers to participation in life activities and life satisfaction among civilians with spinal cord injury (SCI) [15]. The authors reported that the most influential barriers included the natural environment, the availability of transportation, the need for help at home, the availability of healthcare, and government policy [16]. Similarly, Lysack et al. identified similar environmental factors that influenced CR in a civilian sample with SCI [16]. The top five barriers included the natural environment, government policies, transportation, availability of healthcare services, and attitudes at home. This study found a negative correlation between environmental barrier scores and community integration, indicating that participants who report fewer environmental barriers reported greater integration into their community. However, these studies are limited to civilian samples. No studies have reported whether injured servicemembers experience similar environmental barriers and to what extent these barriers influence participation. It is likely that environmental influences differ between civilians and servicemembers. For example, servicemembers tend to have different healthcare access and additional governmental policies intended to support them in comparison with civilians. Incongruent access to resources may result in different CR experiences between these two populations. Many authors have recognized the limitations in this area of research and the need to better understand how the environment influences both civilians and servicemembers with traumatic injury [15,16–19].

Personal factors may also affect CR. The ICF does not fully classify personal factors; therefore, SCT served as the theoretical basis for conceptualization and measurement of personal factors. SCT hypothesizes that motivation for behavior change is influenced through interactions between three factors: internal personal factors, environmental influences, and behaviors [19]. SCT defines personal factors as the personal characteristics and beliefs of a person, of which self-efficacy plays a vital role. Self-efficacy influences the individual's pessimism or optimism, decisions on whether to undertake challenges, effort to overcome challenges, and perception of failure or success as motivating or demoralizing [20].

Benight and Bandura published a review of articles related to SCT, perceived self-efficacy, and recovery from traumatic experiences (e.g., military combat, natural disasters, assault) [20]. The authors summarized that perceived self-efficacy served as a mediating variable to posttraumatic recovery across multiple types of traumatic events. Generally speaking, individuals who believed they had the ability to take control over their lives were better at overcoming their situations instead of allowing their circumstances to direct their lives. In relation to the experience of severe war-related trauma, servicemembers with lower perceived efficacy presented more severe symptoms of emotional distress. Similar results were also noted in a number of studies of PTSD stemming from war-related trauma. Servicemembers as well as civilians with PTSD exhibited a lower level of perceived efficacy, whereas those without PTSD who had similar war-related experiences exhibited higher levels of perceived efficacy.

Summary

Prior research suggests that environmental and personal factors play a significant role in the lives of military servicemembers, especially those who have been injured. However, the links between environmental factors, personal factors, and CR postinjury have not been identified among injured servicemembers. It is likely that contextual factors will greatly influence an injured servicemember's ability to participate in the home and community [5]. Therefore, the purpose of this study was to identify the contextual influences related to CR among a sample of community-dwelling servicemembers from the Global War on Terrorism who have sustained physical and/or psychological injuries.

METHODS

The following methods were used to recruit participants, determine participant level of CR, identify groups of servicemembers with similar CR scores, and identify the contextual factors that influence CR.

Participants and Procedure

Participants were included in the study if they were injured, community-dwelling servicemembers from the Global War on Terrorism with single or multiple physical, psychological, and/or emotional injuries. Participants indicated their type(s) of injury in the online survey. Participants were excluded if they were not able to complete the online survey (no participant was excluded due to this

criterion). Verbal implementation of the survey from a researcher was offered if needed, but no participant requested this assistance. Snowball sampling and maximum variation sampling procedures were used to recruit participants [21–22]. Obtaining a sample with large variability in CR scores was a priority to enable meaningful comparisons to be made between participants with different levels of CR [22]. Therefore, a broad range of organizations and individuals assisted in recruiting the highly variable sample. For example, researchers assumed that participants recruited from an online forum may demonstrate a lower level of CR than participants recruited from an adaptive sports program. Organizations and individuals who assisted in recruitment included, but were not limited to, adaptive sports clinics, camps, and other recreational programs; online support forums and services; transitional programs between rehabilitation and community reentry; advocacy groups for veterans benefits; and professional organization listservs. All contacts were requested to widely distribute the study information via email, printed or digital flyers, or word of mouth with their injured servicemembers and any other individual or organizational contacts in order to maximize access to potential participants. Although specific geographic location of the participants was unknown, the organizations contacted for recruitment were located throughout the United States. The number of responses on the online survey determined sample size.

Measures

The following measures were used to assess CR, environmental factors, personal factors, and background variables.

Community Reintegration

The Community Reintegration of Injured Service Members (CRIS) assesses how well injured servicemembers have been able to adjust to life in their home and community since their injury [2,4,7]. The CRIS was chosen due to its development with input from servicemembers and its use of the ICF to operationalize CR. Two scales of the CRIS were implemented: Extent of Participation Scale (EOP) (50 items) (e.g., How often did you engage in hobbies? How often did you exercise or do light to moderate physical activity, such as walking, for at least 30 min?) and Satisfaction with Participation Scale (SWP) (47 items) (e.g., How satisfied were you with your friendships? How satisfied were you with the amount of time you spent in recreational activities, not including time spent watching television?). These scales have demonstrated strong item reliability (range = 0.87–0.96); demonstrated strong content, construct, convergent, and discriminant validity indices; and presented large factor loadings (i.e., EOP = 0.91, Perceived Limitations = 0.93, SWP = 0.97) in preliminary testing [2]. Additional testing with severely injured servicemembers further demonstrated excellent test-retest reliability, strong concurrent validity, and known group validity [4].

In the current study, only two of the CRIS subscales were included to limit respondent fatigue and reduce the risk of attrition due to the number of items in all three CRIS subscales. The EOP and SWP were implemented due to their applicability to the study's definition of CR, where both objective (i.e., EOP) and subjective (i.e., SWP) aspects were taken into account. Subscale scores range from 20 to 70, where a higher score on the CRIS subscales indicates a higher level of CR.

Environmental Factors

The Craig Hospital Inventory of Environmental Factors (CHIEF) [23], specifically the CHIEF short form (CHIEF-SF), was implemented to measure the frequency and extent to which environmental factors, as classified in the ICF, serve as barriers to CR. The CHIEF measures frequency of environmental barriers in five factors, including attitudes and support, services and assistance, physical and structural, policies, and work and school. Following each item is a follow-up question measuring the magnitude of the barrier, indicating whether the barrier is not a problem, a little problem, or a big problem. The overall effect of the barrier is calculated by taking the product of the frequency score and the magnitude score. Scores range from 0 to 8, where a higher score indicates the factor is a larger barrier. The CHIEF-SF was used in the current study and includes the 12 items that best reflect the five factors measured in the instrument. This instrument has demonstrated good psychometric properties, including high test-retest reliability (intraclass correlation coefficient = 0.93) and high internal consistency (Cronbach alpha = 0.93) [23] and has been used with a number of disability types, including SCI [15–16], BI [24], and youth with physical disabilities [25].

Personal and Background Factors

To capture a dimension of how personal factors, as conceptualized by SCT, influence an injured servicemember's ability to reintegrate, general self-efficacy was

measured using the New General Self-Efficacy Scale (NGSE) [26]. The NGSE is a unidimensional, eight-item scale measuring general self-efficacy, defined as a person's "tendency to view themselves as capable of meeting task demands in a broad array of contexts" (p. 63) [26]. Psychometric testing yielded high content and predictive validity and relatively high internal consistency (Cronbach alpha = 0.86 and 0.90, respectively) [26]. Scores range from 1 to 5, where a higher score indicates higher general self-efficacy.

Many background variables were selected based on previous research and relevance of the variable to injured servicemembers and their CR. Research indicates that individuals with BI, one of the leading injuries among servicemembers, vary in their level of participation in productive activity depending on sex [27], time since injury [28], severity of injury, and rehabilitation program attended [29]. Therefore, these variables were measured on the survey. Other variables hypothesized to potentially influence servicemember CR were age, military branch affiliation, military conflict involvement, years of military service, whether injured in Active Duty or reserves, injury type, perceived level of disability and/or handicap, past alcohol or substance abuse issues, past suicidal ideation (i.e., Have you ever had serious thoughts about committing suicide?), type of physical rehabilitation program attended, experience with CR during rehabilitation, current employment status, number and age of children, recent separation or divorce, intimate relationship status, and dependable family or friends in the community. Due to difficulty finding a very short scale of perceived disability, a question on self-reported disability and/or handicap was developed. After reviewing measures of perceived level of disability and/or handicap as well as measures of CR and participation for guidance, the following question was developed: Overall, how would you describe your disability or handicap? The scale included not disabled or handicapped, slight, moderate, somewhat severe, or very severe. The question and scale most closely resemble a demographic item included in the Community Participation Indicators measure [30], and the research team agreed that the question as written would accurately indicate perceived disability.

These measures and questions were included in an online, Internet-based survey instrument using Qualtrics (Provo, Utah). At the beginning of the survey, participants viewed an information page on the study and provided informed consent to continue with the survey. The next sections of the survey incorporated the EOP and SWP, CHIEF-SF, NGSE, and background questions. The survey consisted of 144 total questions; however, "skip logic" was incorporated in the survey for questions that may not be applicable to the participant (e.g., rehabilitation questions not shown for participants who did not attend rehabilitation), thus varying the number of questions viewed by each participant. The scales were randomly presented in the survey to reduce the risk of a high rate of missing data on any particular scale. Participants were provided an area to give their name, telephone number, and/or email address so they could be reached for potential follow-up.

Statistical Analyses

Data were analyzed using the SPSS statistical package version 20.0 (IBM Corporation; Armonk, New York). Scatterplots and K-means cluster analysis were used to determine clusters of participants based on their EOP and SWP scores. Since the EOP and SWP represented the dependent variable of CR, the clusters of participants resulting from the cluster analysis represented groups of participants with different levels of CR. These clusters served as the means of comparison for the remaining analytic procedures. Multivariate analysis of variance (MANOVA) and discriminant analysis were used as the primary analytic techniques in the study. MANOVA was used to determine the between-subject effect sizes (i.e., main effects) for each contextual variable. Least significant difference (LSD) post hoc tests determined whether significant mean differences were observed between clusters. The findings from the MANOVA model also helped to inform the variables included in the discriminant analysis. Additional Pearson chi-square tests were used to determine group differences on other nominal background variables (e.g., sex, conflict involvement, type of injury). Discriminant analysis using the direct method determined the relative contribution of contextual factors and yielded an estimate of the variable's ability to discriminate between clusters of participants.

RESULTS

The sample consisted of 51 injured servicemembers with a mean ± standard deviation age of 39.26 ± 9.64 yr. Most participants were injured on Active Duty, and a higher percentage was injured in Operation Iraqi Freedom than in other conflicts. BI was the most frequently

reported single injury followed by sensory impairments, SCI, amputation, and burns, but it is notable that most servicemembers in the sample had multiple injuries. Other injuries reported included non-SCI related nerve damage, other musculoskeletal injuries, chronic fatigue, and infections. **Table 1** shows descriptive statistics for the sample.

Regarding CR scores, the sample's average score on the EOP was 45.77 ± 9.98 and on the SWP was 46.47 ± 13.13, indicating a fairly low level of CR. EOP and SWP demonstrated a significant positive correlation ($r = 0.675$, $p < 0.000$). General self-efficacy, all environmental barriers, and perceived level of disability and/or handicap had significant relationships with EOP and SWP, with the exception of the relationship between perceived level of disability and/or handicap and EOP. **Table 2** reports correlations.

Cluster Analysis

Visual analysis of scatterplots indicated the presence of three potential groups based on EOP and SWP scores; therefore, three groups were entered into the K-means cluster analysis. The results provided further support for three clusters, and we labeled the clusters as low, moderate, and high CR. Cluster analysis assigned 10 cases to the low CR cluster, 22 to the moderate CR cluster, and 18 to the high CR cluster. One case was removed from the analysis due to the participant only completing one item on the SWP and two items on the EOP. The **Figure** shows the scatterplot with participant cluster assignments.

Multivariate Analysis of Variance and Pearson Chi-Square

MANOVA models were tested to determine mean differences between the three CR clusters based on multiple contextual measures. The initial MANOVA models included all contextual and background variables. Once significant independent variables were identified, another MANOVA model was tested with nonsignificant variables removed to better estimate their effects. The MANOVA model included all CHIEF-SF factor scores (e.g., environmental barriers); NGSE scores, age, years of service, number of deployments, and time since injury (e.g., personal factors); and perceived level of disability and/or handicap as a global measure of function. Significant main effects were found for all five CHIEF-SF factors, NGSE, and perceived level of disability and/or handicap. Results indicated that NGSE had the largest main effect (partial eta squared = 0.633, $F = 38.788$, $df = 2$, $p < 0.000$), followed

Table 1.
Sample descriptive statistics.

Variable	*n* (%)
Sex	
Male	39 (76.5)
Female	11 (21.6)
Military Branch	
Army	32 (62.7)
Marine Corps	11 (21.6)
Air Force	6 (11.8)
National Guard	6 (11.8)
Navy	3 (5.9)
Coast Guard	2 (3.9)
Private Contractor	1 (2.0)
Other	1 (2.0)
Conflict Involvement	
Operation Iraqi Freedom	40 (78.4)
Operation Enduring Freedom	28 (54.9)
Operation New Dawn	4 (7.8)
Other	15 (29.4)
When Injured	
Active Duty	40 (78.4)
Reserves	6 (11.8)
Other	3 (5.9)
Type of Injury	
Brain Injury	22 (43.1)
Sensory	22 (43.1)
Spinal Cord Injury	15 (29.4)
Amputation	13 (25.5)
Burn	4 (7.8)
Posttraumatic Stress Disorder	33 (64.7)
Depression	29 (56.9)
Generalized Anxiety Disorder	21 (41.2)
Other	12 (23.5)
≥2 Injuries	37 (72.5)
Perceived Level of Disability and/or Handicap	
Very Severe	11 (21.6)
Somewhat Severe	13 (25.5)
Moderate	16 (31.4)
Slight	6 (11.8)
Not Disabled	3 (5.9)
Attended Rehabilitation	30 (58.8)
Received Community Reintegration Training During Rehabilitation	
Yes	24 (47.1)
No	6 (11.8)
Data Missing	21 (41.2)
Time Since Injury	
<3 mo	1 (2.0)
3–6 mo	0 (0.0)
6 mo–1 yr	2 (3.9)
1–3 yr	5 (9.8)
3–5 yr	13 (25.5)
>5 yr	28 (54.9)
Past Problem with Alcohol and/or Substances	18 (35.3)
Suicidal Ideation	19 (37.3)
Job in Past 2 wk	22 (43.1)
Intimate Relationship	38 (74.5)
Separated or Divorced	8 (15.7)
Children	30 (60.0)
Dependable Family and/or Friend(s) in Community	38 (74.5)

Note: Not all category counts and percentages equal 51 participants or 100 percent due to overlap in responses (e.g., serving in >1 conflict) or nonresponse.

Table 2.
Correlations between contextual variables and community reintegration measures.

Variable	Extent of Participation	Satisfaction with Participation
General Self-Efficacy		
Pearson Correlation	0.784	0.800
Significance (2-tailed)	<0.000	<0.000
Attitude and Support Barriers		
Pearson Correlation	–0.489	–0.483
Significance (2-tailed)	<0.000	<0.000
Physical and Structural Barriers		
Pearson Correlation	–0.605	–0.623
Significance (2-tailed)	<0.000	<0.000
Services and Assistance Barriers		
Pearson Correlation	–0.599	–0.589
Significance (2-tailed)	<0.000	<0.000
Work and School Barriers		
Pearson Correlation	–0.349	–0.317
Significance (2-tailed)	0.013	0.025
Policy Barriers		
Pearson Correlation	–0.439	–0.409
Significance (2-tailed)	0.001	0.003
Perceived Level of Disability and/or Handicap		
Pearson Correlation	–0.282	–0.343
Significance (2-tailed)	0.052	0.017

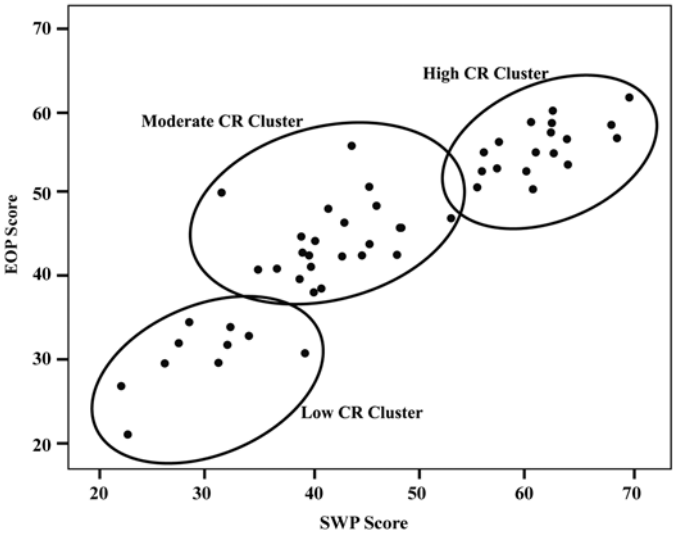

Figure.
Clusters based on community reintegration (CR) scores. EOP = Extent of Participation Scale, SWP = Satisfaction with Participation Scale.

by services and assistance barriers (partial eta squared = 0.387, $F = 14.183$, $df = 2$, $p < 0.000$), physical and structural barriers (partial eta squared = 0.327, $F = 10.914$, $df = 2$, $p = 0.000$), attitudes and support barriers (partial eta squared = 0.276, $F = 8.556$, $df = 2$, $p = 0.001$), policy barriers (partial eta squared = 0.181, $F = 4.958$, $df = 2$, $p = 0.01$), work and school barriers (partial eta squared = 0.146, $F = 3.858$, $df = 2$, $p = 0.03$), and perceived level of disability and/or handicap (partial eta squared = 0.126, $F = 3.229$, $df = 2$, $p = 0.05$).

After the main effects were determined, LSD post hoc analyses and Pearson chi-square tests were used to determine significant differences between high, moderate, and low CR clusters. Post hoc analyses indicated significant differences between clusters on EOP, SWP, NGSE, CHIEF-SF factors, and perceived level of disability and/or handicap. Pearson chi-square tests indicated significant differences between clusters in their observed counts in regards to injury type, including BI, SCI, PTSD, depression, generalized anxiety disorder (GAD), and participants who reported two or more injuries. Significant differences in suicidal ideation were also evident. No other significant differences existed between clusters on other variables (e.g., sex, conflict involvement, injury occurrence, military branch, job in the past 2 wk, intimate relationship status, current relationship status, number and age of children [split into nominal answer options], dependable family and/or friends in community, time since injury, history of alcohol and/or substance abuse, whether rehabilitation services were received, previous experience with CR during rehabilitation, other injuries not specified above, age, years of service, number of deployments). **Tables 3** and **4** report significant group differences, LSD post hoc analyses results, and Pearson chi-square tests results.

In summary, all contextual factors (e.g., all CHIEF-SF factors, NGSE), many types of injury (e.g., BI, SCI, PTSD, depression, GAD, two or more injuries), and perceived level of disability and/or handicap significantly varied between groups to some degree. Suicidal ideation was also more prevalent in the moderate CR group than statistically expected by chance.

Discriminant Analysis

Discriminant analysis using the direct method was performed to further determine which contextual variables best discriminated between CR clusters [31]. The discriminating variables included in the model were the CHIEF-SF factors, NGSE, and perceived level of disability and/or handicap, based on the significant MANOVA findings.

Due to including three groups (i.e., CR clusters) in the model, two discriminatory functions were tested to

Table 3.
Cluster differences on injury and related history, *n* (%).

Injury and Related History	Reintegration Cluster			Total (100%)
	Low	Moderate	High	
Injury Type				
Spinal Cord Injury	7 (46.6)	6 (40.0)	2 (13.3)	15
Brain Injury	8 (36.6)	10 (54.4)	4 (18.1)	22
Posttraumatic Stress Disorder	9 (27.2)	17 (51.5)	7 (21.2)	33
Depression	8 (28.5)	17 (60.7)	3 (10.7)	28
Generalized Anxiety Disorder	5 (23.8)	14 (66.6)	2 (9.5)	21
≥2 Injuries	10 (27.0)	17 (45.9)	10 (27.0)	37
Suicide Ideation	4 (21.0)	13 (68.4)	2 (10.5)	19

Note: All variables had significant Pearson chi-square test ($p < 0.05$).

determine the discriminatory power of the model. A significant Wilk lambda test indicated the discriminatory power of the first function (Wilk lambda = 0.268, $p < 0.000$). With the reduction of discriminatory power after the first function, the second function had a nonsignificant Wilk lambda and did not significantly help discriminate between the clusters (Wilk lambda = 0.898, $p = 0.61$). Therefore, discriminatory estimates are based on the first function. The first function accounted for 95.4 percent of the between-group variance with a canonical correlation of 0.838 (Canonical $R^2 = 0.702$) indicating that the contextual variables, as a pooled variable, were a significant discriminator of group affiliation.

Standardized canonical discriminant function coefficients were used to determine which contextual variables best discriminated between groups. The discriminating power of each contextual variable, in descending order of effect sizes (squared coefficients), included NGSE = 0.685, services and assistance barriers = 0.076, attitudes and support barriers = 0.058, perceived level of disability and/or handicap = 0.057, policy barriers = 0.007, physical and structural barriers = 0.005, and work and school barriers = 0.0007.

To obtain a better indication of how well contextual variables correctly classified each case within the clusters, case classification statistics are reported. Estimates were replicated with cross-validation; however, cross-validated estimates are not reported due to the small original sample size, and drawing a test sample for cross-validation was not adequate. Due to the presence of three clusters, 33.3 percent of the cases were expected to be correctly classified by chance. The model was able to correctly classify 90 percent of cases in the low CR cluster, 77.3 percent of cases in the moderate CR cluster, 93.8 percent of cases in the high CR cluster, and 84.5 percent overall. Therefore, contextual variables were moderately to highly effective in discriminating between servicemembers who scored low, moderate, and high on CR [31].

DISCUSSION

This study aimed to identify contextual factors significantly related to CR in a sample of injured, community-dwelling servicemembers. Clusters of injured servicemembers with different levels of CR were identified and labeled as low, moderate, and high CR. The relative contributions of contextual factors and background variables toward CR

Table 4.
Cluster differences on community reintegration and contextual variables (mean ± standard deviation).

Community Reintegration and Contextual Variables	Reintegration Cluster		
	Low	Moderate	High
Extent of Participation Scale	30.47 ± 3.99[a]	44.54 ± 4.37[a]	55.77 ± 3.09[a]
Satisfaction with Participation Scale	29.49 ± 5.29[a]	41.88 ± 4.77[a]	61.51 ± 4.25[a]
Perceived Level of Disability and/or Handicap	3.10 ± 0.73[a]	2.59 ± 0.95	2.00 ± 1.41[a]
General Self-Efficacy	2.63 ± 0.58[a]	3.59 ± 0.57[a]	4.44 ± 0.35[a]
Physical and Structural Barriers	4.85 ± 2.04[a]	3.02 ± 2.01[a]	1.25 ± 1.64[a]
Services and Assistance Barriers	3.37 ± 1.86[a]	1.59 ± 1.32[a]	.63 ± 0.82[a]
Work and School Barriers	2.55 ± 2.92[a]	1.86 ± 2.16[b]	.52 ± 0.58[ab]
Attitudes and Support Barriers	3.70 ± 2.72[a]	2.86 ± 1.90[b]	1.00 ± 1.22[ab]
Policy Barriers	3.60 ± 2.59[a]	2.46 ± 2.29[b]	1.10 ± 0.93[ab]

Note: Multivariate analysis of variance with least significant difference post hoc tests performed. Possible scores for Extent of Participation Scale and Satisfaction with Participation Scale (range = 10–70, where higher score indicates higher reintegration). General self-efficacy was measured by New General Self-Efficacy Scale on 5-point Likert-type scale (higher score indicates higher general self-efficacy). Barriers were measured by Craig Hospital Inventory of Environmental Factors short form on 5-point Likert-type scale (0 = never a barrier and 4 = daily barrier) multiplied by 2-point scale (1 = little problem and 2 = big problem) (range = 0–8, where higher score indicates larger barrier).

among the three clusters of servicemembers were estimated. Significant differences existed between clusters regarding type of injury (e.g., SCI, BI, PTSD, GAD, depression, multiple injuries) and suicidal ideation. Contextual factors were significantly related to CR cluster affiliation. In particular, general self-efficacy was the strongest predictor of CR, followed by services and assistance barriers, attitudes and support barriers, perceived disability and/or handicap, policy barriers, physical and structural barriers, and work and school barriers. In general, findings suggest that injured servicemembers who were less reintegrated experienced lower general self-efficacy, had more difficulty with various environmental barriers, and viewed the effects of their injuries as more disabling. Suicide ideation was significantly more prevalent in the moderate CR cluster.

The findings from this study are in agreement with much of the literature on CR that reports that many injured servicemembers struggle with CR after injury [1,3–5], as evidenced in the current study where approximately 62 percent of the sample (32 out of 51) categorized as low to moderately reintegrated. Similar to Resnik et al. [3], this study also found that CR scores varied significantly according to type of injury, specifically among servicemembers with SCI, BI, PTSD, depression, GAD, and participants with two or more injuries. Specifically, more servicemembers with these injuries were represented in the low and moderate CR cluster than were expected by chance.

This study contributes to the literature reporting the effects of contextual factors on servicemembers. For instance, general self-efficacy demonstrated the strongest link to CR. This finding is similar to the findings from Benight and Bandura's review discussing self-efficacy as a promoter of recovery from traumatic experiences and post-traumatic recovery in military servicemembers [20]. It may be that servicemembers who are more self-efficacious are more successful at overcoming traumatic experiences and are more successful with CR as a result. More research is needed to investigate the reasons for these links.

This study also found significant negative correlations between environmental barriers and CR, similar to previous studies involving civilians [16–17]. However, the effects of barriers for injured servicemembers differed from the barriers of civilians with SCI. Among civilians with SCI, the natural environment, availability of transportation, need for help at home, availability of healthcare, and governmental policy were the top barriers reported. In comparison, this study found that top environmental barriers for injured servicemembers were services and assistance, attitudes and support, policies, physical and structural, and work and school factors. Interestingly, the two CHIEF-SF items addressing the natural environment and transportation were not significantly related to CR, whereas natural environment and transportation were ranked highly as a barrier for civilians with SCI in previous studies. This finding may be explained by injured servicemembers having more access to appropriate transportation and specialized adaptive equipment designed to assist with negotiation of complex natural environments, for example. However, wheelchair use may also affect natural environment and transportation barriers. Comparisons between the two study samples are limited because wheelchair use information was not collected in this study.

The results of this study are also consistent with prior conceptual and theoretical frameworks addressing the role of contextual factors in CR. Each of the ICF's environmental domains, as measured by the CHIEF-SF, were represented in the findings of the study and presented as significant barriers to CR. Similar to SCT, this study supports that general self-efficacy, as a personal factor, was the strongest contributor to CR. However, this study does conflict with SCT in regards to self-efficacy related to a specific task or behavior. This is due to the limitation in the design of the study where the measurement of self-efficacy of specific tasks was not a feature.

Future studies with larger sample sizes are necessary to more precisely estimate the contributions of contextual factors on CR while controlling for other variables, such as level of disability. The size and variability in this sample were adequate to make comparisons but prevented researchers from using more powerful and predictive statistical procedures. Additional research is also necessary to further interpret and understand the effect of specific environmental and personal factors on the reintegration experiences of injured servicemembers. For example, qualitative research may be able to elicit an interpretation of why, how, and in what capacity general self-efficacy and other environmental factors act as barriers or facilitators of CR, especially since contextual facilitators of CR were not captured in this study. Finally, the prevalence of suicidal ideation within the current study warrants additional investigation since servicemembers in the moderate CR cluster was more likely to report suicidal ideation than those in the low and high CR clusters. It is unclear why

this pattern existed. Studies investigating the contextual experiences and processes that lead to suicidal ideation may clarify this finding and help with understanding how to prevent suicide in the military.

This study is limited in its estimation of CR scores due to using only two of the three CRIS subscales. The Perceived Limitations subscale was not used in the study due to the focus of the study and to limit survey length. We support the development of a short form of the CRIS fixed version to enhance usability of the measure in survey research. The sample size in the study appeared adequate for the analytical procedures employed; however, a larger sample size would have allowed for more powerful statistical techniques to be implemented to more accurately determine the effects of various contextual factors on CR. The generalizability of this study is significantly limited due to the small sample size, and the recruitment procedures did not elicit a nationally representative sample. Specifically, the use of snowball and maximum variation sampling procedures yielded a sample that cannot be generalized to all injured servicemembers due to the likelihood of recruiting servicemembers involved in veteran support organizations in some manner. This involvement is likely not a common occurrence among most servicemembers. This sample is also limited to community-dwelling servicemembers, which does not represent servicemembers who have not yet returned to the community. Another limitation is that injury types were self-reported. We were unable to verify whether the participant, in fact, met the criteria for diagnosis with a particular disorder or injury. The reader should consider these limitations when interpreting results.

CONCLUSIONS

The results of this study show that general self-efficacy, services and assistance barriers, attitude and support barriers, policy barriers, physical and structural barriers, work and school barriers, and perceived level of disability and/or handicap are significantly related to CR in a sample of injured, community-dwelling servicemembers. Although additional research is necessary, it appears that injured servicemembers' personal and environmental contexts after injury, rehabilitation, and military service are important to the frequency and satisfaction of their participation in their home and community. This study supports the need for ecological approaches in rehabilitation and postrehabilitation programs. Ecological approaches address the unique contexts in which the injured servicemembers live and prepare them to negotiate barriers and use facilitators in their environments. It is likely that rehabilitation approaches that extend beyond the injuries of servicemembers and aim to improve their perception of control over their lives despite their injuries (i.e., general self-efficacy) and educate and empower them to overcome barriers (e.g., physical, social, and policy barriers) will improve their ability to reintegrate back into their homes and communities. CR outings to practice barrier negotiation, explore veterans benefits and resource education, explore family education, facilitate participation in adapted sports and recreation, and provide opportunities to create meaningful connections with other servicemembers with similar health conditions are some approaches that may address the contexts of servicemembers' health conditions and the CR process.

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